Small Business Innovation Research/Small Business Tech Transfer

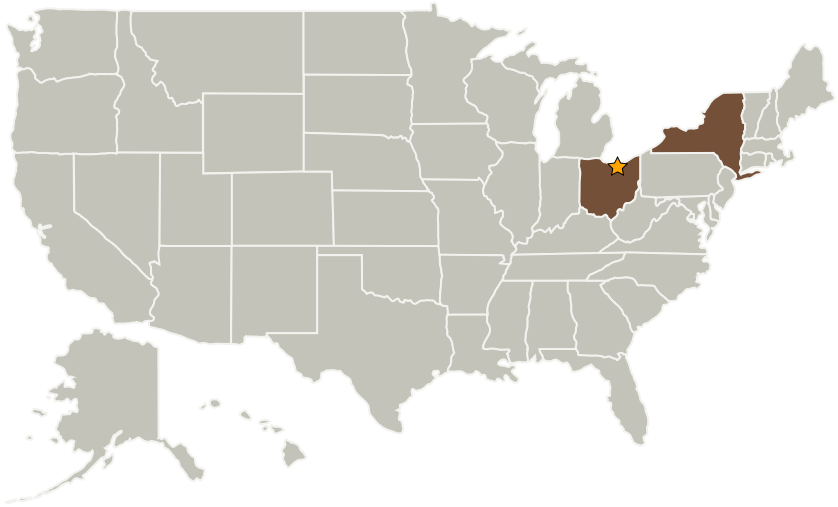
System-Level Development of Fault-Tolerant Distributed Aero-Engine Control Architecture, Phase I

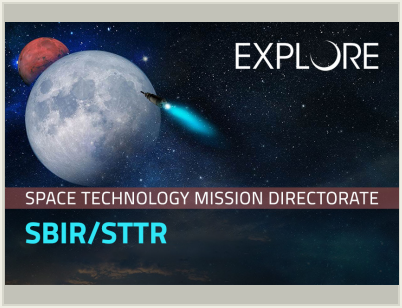
Completed Technology Project (2009 - 2009)

Project Introduction

NASA's vision for an "intelligent engine" will be realized with the development of a truly distributed control system and reliable smart transducer node components; however a significant hurdle in its realization is the reliability of these components when subjected to the harsh operating environment throughout the engine. In this Phase I award, Impact Technologies, in collaboration with GE Aviation, will develop a fault-tolerant smart transducer node through a Distributed Engine Control Simulator (DECSim) design tool that will utilize a commercial of-the-shelf (COTS) open-system communications standard and will interface with the C-MAPSS engine model. In Phase I, Impact will successfully develop: i) the DECSim utility, ii) the smart node self-validation and cross-validation capabilities, iii) the overall distributed control architecture, and iv) the firmware code that will reside on hardware. At the end of the Phase I program, Impact will demonstrate the functionality of a candidate DEC smart node in hardware within the DECSim framework. The final smart node technology will alleviate the severe system-level limitations of current centralized architectures that include a large weight imposition, limited design flexibility, and life cycle cost burdens associated with certification and obsolescence management.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Impact Technologies, LLC	Supporting Organization	Industry	Rochester, New York

Primary U.S. Work Locations	
New York	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.5 Propulsion Flowpath and Interactions